

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/JP2004/009285

International filing date (day/month/year)
24.06.2004

Priority date (day/month/year)
09.07.2003

International Patent Classification (IPC) or both national classification and IPC
G02F1/139

Applicant
CANON KABUSHIKI KAISHA

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized Officer

Wolfrum, G

Telephone No. +49 89 2399-2299



**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2004/009285

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2004/009285

Box No. II Priority

1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-6
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-6
Industrial applicability (IA)	Yes: Claims	1-6
	No: Claims	

2. Citations and explanations

see separate sheet

1 **Re Item V:** Reasoned statement under Article 33 PCT

1.1 Reference is made to the following documents of the International Search Report (ISR):

D1: CLERC F: "ELECTRO-OPTICAL LIMITS OF THE ELECTRICALLY CONTROLLED BIREFRINGENCE EFFECT IN NEMATIC LIQUID CRYSTALS" DISPLAYS, ELSEVIER SCIENCE PUBLISHERS BV., BARKING, GB, vol. 2, no. 7, 1 October 1981 (1981-10-01), pages 341-347, XP002041596 ISSN: 0141-9382

D2: US-A-5 680 184 (NISHINO TOSHIHARU) 21 October 1997 (1997-10-21)

1.2 It would appear that the subject-matter of independent **claim 1** does not involve an inventive step within the meaning of Article 33(3) PCT.

D1 discloses a liquid crystal display device [abstract; pages 346-347, tables and corresponding parts of the text] comprising a polarizing plate [page 343, left-hand column, lines 14-18 and lines 26-37];

a pair of substrates at least one of which is transparent [figs. 1a and 1b, page 341, left-hand column, lines 23-27; page 343, left-hand column, lines 14-18];

a pair of electrodes [e.g. figs. 1a and 1b, page 341, left-hand column, lines 23-34]; and

a nematic liquid crystal [e.g. figs. 1a and 1b, page 341, left-hand column, lines 1-5 and lines 16-21];

said nematic liquid crystal:

being filled between the pair of substrates [e.g. figs. 1a and 1b, page 341, left-hand column, lines 23-34];

being aligned to be substantially perpendicular to the substrates when applying a voltage not higher than a threshold value between the electrodes [fig. 1a, page 341, left-hand column, lines 23-27; page 343, left-hand column, lines 1-11, cf. figs. 2 and 3];

having negative dielectric constant anisotropy [page 341, left-hand column, lines 16-34]; and

undergoing change in tilt angle of alignment with respect to the substrates in accordance with applied voltage when applying a voltage not lower than a threshold value between the electrodes [fig. 1a, page 341, left-

hand column, lines 29-34];

said liquid crystal display device:

displaying red or purple [cf. remarks below; furthermore fig. 5, the optical path difference $\delta(V) = L \Delta n(V)$, i.e. the optical path difference depends on the voltage V ; cf. page 345, left-hand column, lines 4-18] when voltage is applied at a voltage value in a voltage range [fig. 5 shows a voltage range with a maximum voltage such that the optical path difference corresponds to red or purple in fig. 5; page 343, left-hand column, lines 27-37].

D1 does not explicitly disclose that it has a voltage range in which a rate of change in retardation level with respect to temperature becomes substantially zero. However, there are only two possibilities for choosing said voltage range: Either such that the rate of change in retardation level becomes substantially zero or not. Such a mere selection between two options a skilled person necessarily has to carry out when driving an LC-cell as shown in **D1**.

Thus, the subject-matter of **claim 1** does not involve an inventive step over **D1** and common general knowledge.

Remarks (cf. also objections according to Article 6 PCT below):

- a) The subject-matter of **claim 1** does not present a technical feature (such as e.g. a material composition, a specific arrangement of electrodes or a drive circuit providing specific drive pulses) by means of which "a rate of change in retardation level with respect to temperature becomes substantially zero". Thus, it would appear that **claim 1** claims a result to be achieved.
- b) From a more literal point of view it has to be noted that the term "**substantially**" in the wording "a rate of change ... becomes **substantially** zero" can only be permitted if its presence does not prevent the invention from being unambiguously distinguished from the prior art with respect to novelty and inventive step (cf. Guidelines C-III; 4.5a, EPO).

- 1.3 It would appear that the subject-matter of independent **claim 1** does not involve an inventive step within the meaning of Article 33(3) PCT.

D2 discloses the construction of a liquid crystal cell [fig. 23, the "color adjusting cell 60"] with a liquid crystal material as claimed [abstract; fig. 23, ref. 60 and corresponding parts of the description] and a rate of change in retardation level with respect to temperature which substantially becomes zero [fig. 19 and corresponding parts of the description].

D2 does not explicitly disclose a voltage range defined by the colours red or purple, however, the definition of such a range is an arbitrary selection and is not a structural technical feature by which a skilled person can distinguish the device from the prior art. Moreover, a skilled person would routinely choose such a voltage range in case of need and, therefore, the mere definition of a voltage range does not involve an inventive step.

Thus, the subject-matter of **claim 1** does not involve an inventive step over **D2** and common general knowledge.

- 1.4 It would appear that the subject-matter of independent **claim 6** does not involve an inventive step within the meaning of Article 33(3) PCT.

D1 discloses a method for driving a liquid crystal display device [abstract; pages 346-347, tables and corresponding parts of the text] comprising:

- a polarizing plate [page 343, left-hand column, lines 14-18 and lines 26-37];

- a pair of substrates at least one of which is transparent [figs. 1a and 1b, page 341, left-hand column, lines 23-27; page 343, left-hand column, lines 14-18];

- a pair of electrodes [e.g. figs. 1a and 1b, page 341, left-hand column, lines 23-34]; and

- a nematic liquid crystal [e.g. figs. 1a and 1b, page 341, left-hand column, lines 1-5 and lines 16-21];

- said nematic liquid crystal:

- being filled between the pair of substrates [e.g. figs. 1a and 1b, page 341, left-hand column, lines 23-34];

- being aligned to be substantially perpendicular to the substrates when a voltage not higher than a threshold value is applied across the electrodes [fig. 1a, page 341, left-hand column, lines 23-27; page 343, left-hand

column, lines 1-11, cf. figs. 2 and 3];

having negative dielectric constant anisotropy [page 341, left-hand column, lines 16-34]; and

undergoing change in tilt angle of alignment with respect to the substrates in accordance with applied voltage when applying a voltage not lower than a threshold value between the electrodes [fig. 1a, page 341, left-hand column, lines 29-34];

the device further comprising a first pixel [cf. fig. 9, page 345, right-hand column, lines 9-17; pages 346-347] having a voltage range [figs. 4 and 5 and corresponding parts of the text] and a second pixel provided with a green colour filter [cf. fig. 9, page 345, right-hand column, lines 9-17; pages 346-347; fig. 5, page 343, left-hand column, lines 27-37, green is also a colour of the variable hue filter; cf. page 345, left-hand column, lines 4-18];

the method comprising the steps of:

applying voltage at a maximum voltage value in the voltage range when red or purple is displayed [cf. remarks for **claim 1** above; furthermore fig. 5, the optical path difference $\delta(V) = L \Delta n(V)$, i.e. the optical path difference depends on the voltage V ; cf. page 345, left-hand column, lines 4-18];

applying a voltage higher than the maximum voltage value in the voltage range when blue is displayed [figs. 4 and 5, page 343, left-hand column, lines 12-37; cf. page 345, left-hand column, lines 4-18]; and

applying voltage to the pixel with a green colour filter when green is displayed [fig. 5, page 343, left-hand column, lines 27-37, green is also a colour of the variable hue filter; cf. page 345, left-hand column, lines 4-18].

D1 does not explicitly disclose that it has a voltage range in which a rate of change in retardation level with respect to temperature becomes substantially zero. However, there are only two possibilities for choosing said voltage range: Either such that the rate of change in retardation level becomes substantially zero or not. Such a mere selection between two options a skilled person necessarily has to carry out when driving an LC-cell as shown in **D1**.

Thus, the subject-matter of **claim 6** does not involve an inventive step over **D1** and common general knowledge.

1.5 It would appear that the subject-matter of the following dependent claims

does not involve an inventive step within the meaning of Article 33(3) PCT.

- 1.5.1 **Claim 2: D1** discloses that when voltage is applied at a maximum voltage value in the voltage range, a colour displayed is present in the region that satisfies two expressions, $x > 0.4$ and $y < 0.45$, in the xy chromaticity coordinates [e.g. red, e.g. $x = 0.6$ and $y = 0.3$; cf. page 345, left-hand column, lines 4-18]. Thus, its subject-matter does not involve an inventive step over **D1** and common general knowledge.
- 1.5.2 **Claim 3: D1** discloses which displays blue at a voltage value beyond the voltage range [figs. 4 and 5, page 343, left-hand column, lines 12-37; cf. page 345, left-hand column, lines 4-18]. Thus, its subject-matter does not involve an inventive step over **D1** and common general knowledge.
- 1.5.3 **Claim 4: D1** discloses a display which displays green by using a colour filter [fig. 5, page 343, left-hand column, lines 27-37, green is also a colour of the variable hue filter; cf. page 345, left-hand column, lines 4-18]. Thus, its subject-matter does not involve an inventive step over **D1** and common general knowledge.
- 1.5.4 **Claim 5: D1** discloses a display which displays black when no voltage is applied [figs. 4 and 5, page 343, left-hand column, lines 12-37]. Thus, its subject-matter does not involve an inventive step over **D1** and common general knowledge.

- 1.6 An analysis of the prior art available at present to the Authority indicates that the subject-matter of none of the independent or dependent claims seems to be novel and involve an inventive step.

However, the subpixel arrangement of an RGB pixel described in example 3 (page 23, lines 9 to 26 of the description) comprising one subpixel with a fixed green colour filter on the subpixel LC-cell and the remaining two subpixels constructed as ECB type subpixels providing voltage controlled colour (red and blue, e.g. by different subpixel LC-cell thicknesses) through the LC without an additional colour filter might involve an inventive step.

- 1.7 Certain observations according to Article 6 PCT

- 1.7.1 **Claims 1 and 6** do not satisfy the clarity requirements of

Article 6 PCT.

- a) The subject-matter of **claims 1 and 6** does not present a technical feature (such as e.g. a material composition, a specific arrangement of electrodes or a drive circuit providing specific drive pulses) by means of which "a rate of change in retardation level with respect to temperature becomes substantially zero". Thus, it would appear that **claim 1 and 6** claim a result to be achieved.
- b) From a more literal point of view it has to be noted that the the term "**substantially**" in the wording "a rate of change ... becomes **substantially** zero" can only be permitted if its presence does not prevent the invention from being unambiguously distinguished from the prior art with respect to novelty and inventive step (cf. Guidelines C-III; 4.5a, EPO). In particular, a term such as "substantially" cannot establish novelty or an inventive step.

1.7.2 **Claim 2** does not satisfy the clarity requirements of Article 6 PCT. **Claim 2** cannot be considered as a dependent claim of **claim 1** since the mentioned chromaticity coordinates comprise more colours than red and purple, e.g. yellow and orange. Thus, the subject-matter of dependent **claim 2** is broader than the subject-matter of independent **claim 1**.

1.8 Certain defects in the international application

- 1.8.1 The independent **claims 1 and 6** are not in the two-part form in accordance with Rule 6.3(b) PCT, with those features known in combination from the closest prior art being placed in a preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in a characterising part (Rule 6.3(b)(ii) PCT). In addition, the applicant should ensure that it is clear from the description which features of the subject-matter of the independent claims are known from the closest prior art document.
- 1.8.2 The description does not meet the requirements of Rule 5.1(a)(ii) PCT since it does not acknowledge and cite the relevant prior art, specifically not that of documents **D1** and **D2** referred above.
- 1.8.3 The features of the claims should be provided with reference

- 1.8.4 signs to the figures placed in parentheses (Rule 6.2(b) PCT).
Reference signs not mentioned in the drawings shall not appear in the description, and vice versa according to Rule 11.13 (I) PCT (see e.g. fig. 1, ref. 86 and fig. 9, ref. "G"). Furthermore, the wavelength-numbers given in fig. 10 appear incorrect.